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MAY 10, 1952

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

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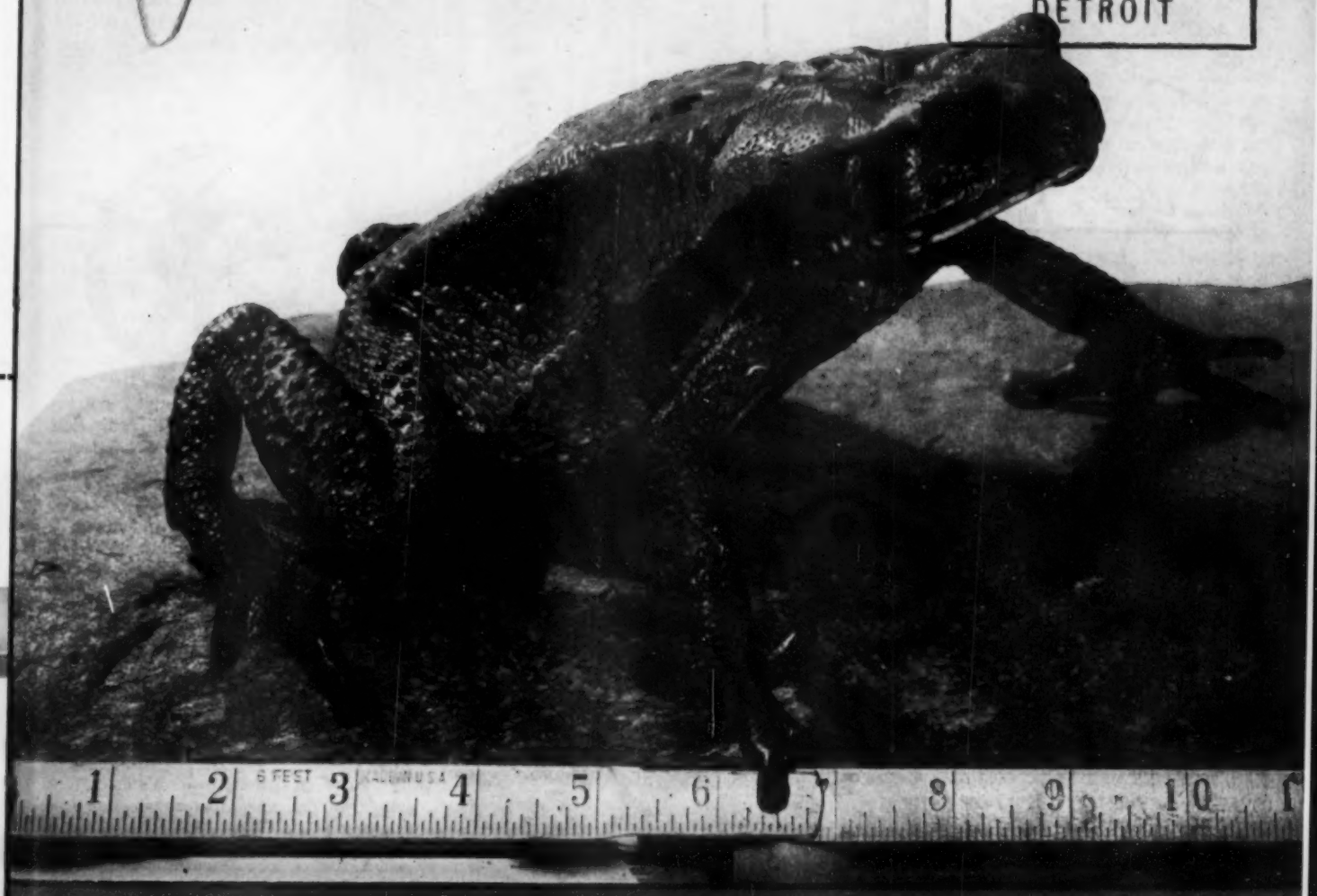

New Giant Toad

See Page 293

A SCIENCE SERVICE PUBLICATION

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VOL. 61 NO. 19 PAGES 289-304

Now! Record your own sound on 16 mm film!

New RCA Magnetic Recorder-Projector records sound on 16mm film, projects movies and reproduces either magnetic or optical sound track. Can also operate as tape recorder or public-address system.

Another RCA First!

Amazing new RCA recorder-projector

Think of it!

An easy, low-cost way to put *your own sound track* on any single-perforation 16mm movie film . . . thanks to RCA's revolutionary new magnetic recorder-projector. Now you can:

- ***Record voice or music or both***
- ***Play back instantly***
- ***Erase mistakes and re-record***

. . . and it's all so simple that anyone—yes *anyone*—can do a top-quality job right from the start!

Records on Magnetic Stripe

It's *magnetic* sound—recorded on a narrow stripe of magnetic iron oxide, applied along one edge of your single-perforation movie films. (If your film is *double* perforated, a *single*-perforation duplicate print must be made.) Once this magnetic sound stripe has been added, you can do all sorts of wonderful things. For instance, you can . . .

1. **Add sound to all your old silent 16mm films, at either 16- or 24-frame speed.**
2. **Record new, up-to-date sound on all your old 16mm sound movies.**
3. **Add the new *magnetic* sound track without destroying the old *optical* sound track. Thus you can play back *either* sound track from the same film. (Example: Have English and Spanish on the same film.)**
4. **Erase and re-record the magnetic sound whenever necessary to keep it up-to-date or to adapt it to any requirement.**

All this and superb movies too!

It's really two machines in one: a complete magnetic recorder plus a 16mm film projector. It projects film with clean sharp professional quality and it reproduces sound (from either optical or magnetic track) with clear-cut, lifelike realism. It's the kind of *quality* you'd expect from RCA—builder of big theatrical-type 35mm movie projectors—world famous for sound and film recording.

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You'll save enough on your first few film-recording jobs to pay for this new RCA machine. You can put new sound on a 10-minute movie for a cost of only a few dollars . . . actually about 11% of the cost of optical sound! *Salvage all your old movies*—make them useful again. Here indeed is the greatest tool ever developed for folks who use 16mm films. All built and backed by RCA—foremost pioneer in 16mm sound-film projection. Performance proved by months of tests and on-the-job use.

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No special facilities needed. Anyone can do it 'most anywhere. Here's how:

First—you have a stripe of magnetic iron oxide added to your existing 16mm single-perforation films. (This service is now available, costs only a few cents a foot.)

Second—you project this film in the new RCA Magnetic Recorder-Projector.

Third—as you watch the projected picture, you speak into a microphone and record *your own sound track* on the film. Add recorded background music if desired. Erase mistakes and re-record. Play back instantly.

And that's all there is to it. It's actually so simple you can *sound like a professional* the first time you do it!

More information? Mail coupon Today

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Without obligation, please send me full story on new RCA Magnetic Recorder-Projector that puts *my own sound track* on 16mm movie film.

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RCA **RADIO CORPORATION of AMERICA**

MEDICINE

Humidity Brings Polio

Outbreaks of infantile paralysis are correlated with relative humidity of atmosphere. May permit prediction of when and where epidemics will strike.

➤ IT'S NOT the heat but the humidity that makes our infantile paralysis outbreaks come in the summer.

This new significance to the old saying about summer weather comes from a study reported by Dr. Charles Armstrong of the U. S. National Institutes of Health to the National Academy of Sciences in Washington.

The fact that infantile paralysis, or poliomyelitis, outbreaks come in hot weather has long been recognized. Heretofore, however, no one has been able to show a relation between the polio outbreaks and the humidity. The reason, Dr. Armstrong explained, is that previous attempts to find such a relation have usually considered relative humidity at atmospheric temperatures.

This treats man as though he were a cold blooded animal and neglects the fact that he has "a most remarkable and efficient air-conditioning apparatus" in his nose and throat, Dr. Armstrong stated.

This apparatus, except under extreme atmospheric conditions, warms air as it is breathed in to a uniform temperature of about 90 degrees Fahrenheit and adjusts its relative humidity to about 90% of saturation.

When cold dry air of winter is breathed, the lining membranes of the nose and mouth produce more secretions. Otherwise the membranes would soon be parched. The secretions are concentrated through the increased evaporation and this happens whether or not the air is artificially warmed. Probably other changes, in blood supply and reactions of the cells, accompany weather changes.

These changes in winter hinder the spread of polio, Dr. Armstrong believes. In summer, when the nose and throat air conditioning apparatus is quieter, the spread of polio is favored.

Comparing times of polio outbreaks with relative humidity records for two regions gave further evidence for this. In 1950, the polio outbreak in the Washington, D. C., area began when the relative humidity reached 27% to 28% of saturation and the outbreak disappeared in the fall when the humidity fell below 27%. Five peaks of high humidity during the summer coincided with five peaks of high numbers of polio cases.

In the semi-arid region of Denver, Colo., Dr. Armstrong found the same relation. The humidity rose to two peaks, each followed by a peak in polio cases.

Dr. Armstrong is the first scientist to report this relation between humidity and poliomyelitis. But he has had letters from two different scientists in Australia and one in New England saying that these scientists had observed the same relation.

Controlling atmospheric humidity to escape polio seems impractical, but Dr. Armstrong thinks health departments, hospitals and doctors will be able to tell from the humidity records when an epidemic or fresh rise in cases is due in a particular region and can plan accordingly.

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MEDICINE

Plastic Kidney to Aid Study of Heart Disease

➤ NOW PATIENTS suffering from acute kidney failure, as in certain kinds of poisonings, can be helped by a plastic kidney which takes over while theirs recovers.

A clinical model of the plastic artificial kidney has performed "outstandingly" in trial on several patients in Pittsburgh and at Peter Bent Brigham Hospital, Boston, Dr. T. S. Danowski of Pittsburgh reports.

Advantages of the plastic over other types of artificial kidneys are greater ease of sterilization and greater mobility. It can be easily moved from one hospital to another in case of emergencies.

The plastic kidney was designed and developed by George W. Jernstedt and Harry H. Barker of Westinghouse Special Products Engineering Department, Pittsburgh.

Science News Letter, May 10, 1952

OCEANOGRAPHY

Reach Record Depths In Pacific Near Guam

➤ RECORD DEPTHS of more than 35,000 feet have been reached in the Pacific about 200 miles from the island of Guam by the research vessel H. M. S. CHALLENGER, it was announced in London.

A weighted wire dropped from the ship plunged to 35,232 feet in the vicinity of latitude 11 degrees, 20 minutes north and longitude 142 degrees 16 minutes east last summer, officials of the Hychographic Department of the Admiralty said. About a mile and a half to the southeast of this spot, another weighted wire, dropped in the early fall, went down 35,640 feet.

These record depths were found in what is called the Mariana Deep, one of the many holes found in the Pacific Ocean.

Science News Letter, May 10, 1952

PLASTIC KIDNEY—This top view of the plastic kidney shows how the machine performs the same function as the human organ in cleansing impurities from the blood. The electric-eye safety device in the center automatically shuts the kidney off if trouble develops.

MEDICINE

Three-Way Cancer Attack

New chemicals or different combinations of them, starving the cancer and finding materials that make cancer more easily treated are the three prongs.

➤ THE CHEMICAL attack on cancer these days is three-pronged.

One prong consists of the search for and trial of new chemicals and combinations of them that might destroy the cancer without harm to the rest of the body. Among the newest of these are compounds called ethylene amines developed in the research department of Lederle Laboratories at Pearl River, N. Y. Three of these have now been selected as worthy of trial on patients, following further pharmacological studies, Dr. J. H. Williams, speaking for the research team, told members of the American Association for Cancer Research at their meeting in New York.

A second prong of the chemical attack on cancer consists of withholding chemicals from the patient's diet. Some of this work has reached the stage of human trials. The hope of such studies, of course, is to find a way of starving the cancer to death without cutting down too much on food needed by the rest of the body.

Signs that this might be good treatment for patients with Hodgkin's disease were reported by Dr. Walter J. Frajola and associates of Ohio State University College of Medicine. The chemicals they withheld are two protein building blocks, lysine and phenylalanine. The diet their patients got during these studies consisted of a cornstarch pudding, "cake," and water mixtures of the essential amino acids, minus the one under study.

Third prong of the chemical attack on cancer consists in finding chemicals that might make cancers more susceptible to X-rays. Sometimes a chemical is given for this purpose but in studies by Dr. W. R. Franks and associates at the University of Toronto, the plan was to try withholding certain chemicals.

When they kept copper out of the diet of mice with a transplanted tumor, the tumor grew at a slower rate and was more susceptible to X-rays. Keeping magnesium out of the diet, on the other hand, caused slower growth of the tumors but did not increase the effect of X-rays. If anything, it lessened their effectiveness.

To scientists, the importance of these studies lies in the knowledge gained about fundamental chemical processes under restrictions of copper or magnesium. The effectiveness of X-rays is increased, the copper part of the study suggests, when the amount of catalase in the body is decreased. Decrease in the activity of the enzyme, catalase, would be expected to reduce the rate of removal of any peroxide formed by the irradiation. From such clues might come better methods of treatment.

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MINERALOGY

Mineral Nasonite Found In West for First Time

➤ A DEPOSIT of the extremely rare mineral nasonite, one part of it yellow and the other a pale bluish-green, has been found for the first time in the West in a commercial quarry at Crestmore near Riverside, Calif. The only other known occurrence of nasonite is in zinc deposits at Franklin, N. J.

The discovery was made by Dr. Joseph Murdoch, professor of geology at the University of California at Los Angeles. Nasonite, he said, is a form of calcium lead silicate and is derived from earlier galena. The variation in color is due to accessory elements, vanadium accounting for yellow, copper for blue. Nasonite is such a rare mineral that it has no commercial value.

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Question Box

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PSYCHOLOGY

Suggestion Helps Learning

Suggestion in trance makes five seconds seem like five minutes. More accomplished in this distorted time, learning tests show.

➤ STUDENTS WANTING to cram for final examinations might try getting themselves hypnotized. While hypnotized, they can gain time and learn much more.

This possibility results from experiments by Dr. Linn F. Cooper, Washington physician, and David W. Rodgin, also of Washington, now a graduate student in psychology at Purdue University. Rodgin was the guinea pig in hypnosis learning experiments while a student at George Washington University.

An individual's inner sense of time can be so distorted by suggestion under hypnosis that a period of only five seconds will seem to him to be four or five minutes, Dr. Cooper and Mr. Rodgin found.

"Apparently, time can be given to the hypnotized subject," they said.

To test the effect of thus slowing down time on the amount that could be learned in five-second study periods, the scientists repeated a standard learning experiment with nonsense syllables or letter groups. A pair of the three-letter groups was printed on each of 150 cards.

In the first part of the experiment, the cards were shown to Mr. Rodgin and read to him slowly. Then he was allowed to print the letters five times and study them. This took about 26.5 seconds. After a set of five cards was learned in this way, the whole set was run through to test the learning. After shuffling the cards, Dr. Cooper would read the first group and Mr. Rodgin would give the second of the pair. Then the card was displayed and Mr. Rodgin allowed to study it for five seconds. This running through the cards was repeated until he could give the second group of each pair perfectly.

Next the subject was hypnotized, his sense of time altered, and the experiment was repeated, using another series of cards. In this case he kept his eyes closed and printed the letters only in his imagination. This took him only five seconds instead of the 26 used while he was awake. Under hypnosis, he was able to master in only 7.4 seconds what it had taken him more than four times as long to learn while awake. And the learning seemer easier and more leisurely. Tested after 24 hours, he had retained more of what he learned under hypnosis and could re-learn the forgotten material in less time.

Details of the study are reported in the journal SCIENCE (May 2).

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CLOSED CANOPY EJECTIONS—Tests to determine the effect of a pilot firing himself through the canopy of his disabled aircraft are being made at the Naval Air Material Center in Philadelphia. The pilot and the net in which he will be caught are shown in this just-declassified photograph.

BIOLOGY

Two-Pound Giant Toad Discovered in Ecuador

See Front Cover

➤ A NEW species of giant toad, measuring at least eight inches in length and weighing about two pounds, has been discovered in South America.

Existence of the giant toad in a remote province of southwestern Colombia had been rumored and the first specimen was brought back from the region by Rolf Blomberg of Quito, Ecuador. Mr. Blomberg was told by the natives that his specimen was only half as large as the largest examples found in this rain-drenched tropical area.

During 1951, three more of the new toads were picked up and are now in the New York Zoological Park. The toad, named *Bufo blombergi*, is believed to be a Pacific slope giant relative of a small toad found on the Atlantic side of the Andes. These mountains form a very effective barrier to east-west migration of tropical species, Dr. George S. Myers and John W. Funkhouser of the Natural History Museum at Stanford University in California report. The zoologists describe the new species in ZOOLOGICA, a publication of the New York Zoological Society.

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PLANT PATHOLOGY

Plant Virus Diagnosis By Ultraviolet Light

➤ ULTRAVIOLET LIGHT is used in a new method of diagnosing plants sick or infected with virus diseases.

Developed at the State College of Washington's Tree Fruit Experiment Station at Wenatchee, Wash., portions of leaves are used in the test in making extracts of the material that is then used for the determination of ultraviolet absorption spectra.

This pattern of light is characteristic of different virus diseases, giving hope that they can be detected, cured and prevented. Color and staining tests have not been able to separate one virus from another.

The scientific team reporting their researches to the journal SCIENCE (May 2) consisted of Drs. R. C. Linder, H. C. Kirkpatrick and T. E. Weeks, who are connected with the U. S. Department of Agriculture as well as with the Washington state experiment station.

Science News Letter, May 10, 1952

ACOUSTICS

Holes in Congress Ceiling Help Hearing

➤ THERE ARE thousands of holes in the ceilings of the Senate and House Chambers so that the words of wisdom members utter won't bounce back at them.

The tiny holes, 15 to the square inch and 3/32nds of an inch in diameter, solve an acoustical problem presented by the new domed ceilings designed to reflect the indirect lighting of the legislative chambers. With these holes, and with other acoustical improvement, the Senators and Representatives can hear each other much better.

The smooth surface of the domed ceiling was just the thing to produce echoes. However, the holes let the "pointing with pride" and "viewing with alarm" of the legislators go through to a chamber above where sound absorbent material captures them.

Dr. Paul E. Sabine, Colorado Springs, Colo., was acoustical consultant in the remodeling of the two chambers. He reported on his work in the JOURNAL OF THE ACOUSTICAL SOCIETY OF AMERICA (March).

Science News Letter, May 10, 1952

METALLURGY

Metals Melted in Mid-Air; No Container Contamination

➤ METALS BUOYED in the air by invisible electromagnetic fields can be melted without having any container around them through a new process described to the American Physical Society meeting in Washington by five scientists of the Westinghouse Electric Corporation Research laboratory.

As reported by E. C. Okress, D. M. Wroughton, G. Comenetz, P. H. Brace and J. C. R. Kelly, "electromagnetic levitation" is the answer to many problems created by titanium and other metals which combine with other materials during refining stages.

Mr. Brace told SCIENCE SERVICE that, basically, metals such as aluminum can be suspended in opposing electromagnetic fields generated in two conical coils, one suspended above the other. The coils operate on 9,600-cycle alternating current.

The metal becomes molten under the inductive-heating influence of the electromagnetic field. It melts, but is held together by an oxide film formed where the metal comes in contact with the air. When oxide films do not form, the material is held together by surface tension.

Chunks of aluminum as large as four inches long by two and one-half inches in diameter have been melted successfully using the new method. Silver samples, however, have been smaller because surface tension is depended upon to keep the molten metal together.

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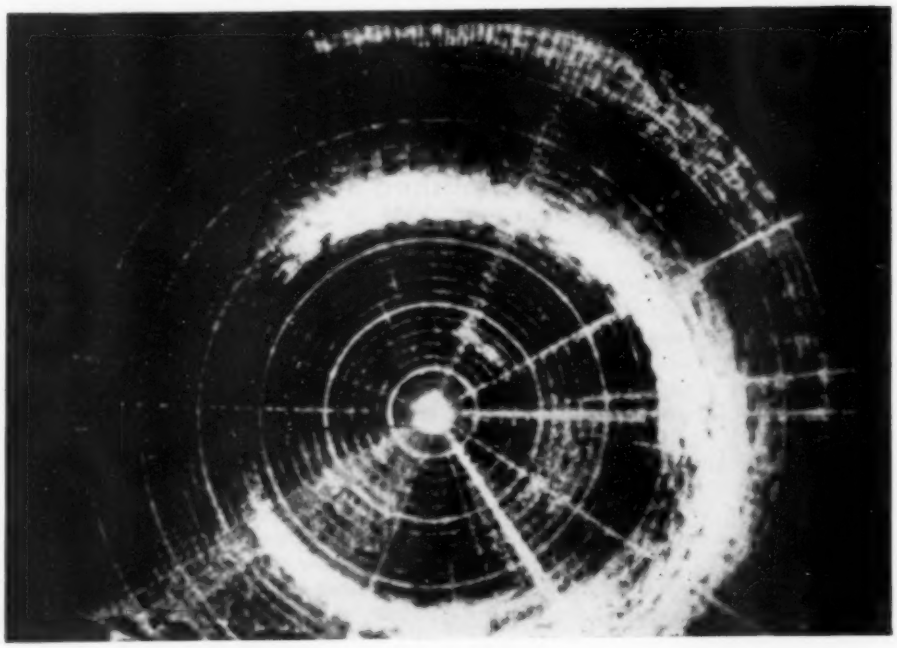

PREDICTING RECEPTION—The bright areas on the screen of this oscilloscope show where radio communication can be conducted from the sender's station, the bright spot in the center, the top part of the screen being north. Bright rings mark the distances, with the outer edge indicating about 3,000 miles.

RADIO

Radio Reception Areas

System held in secrecy for four years tells at a glance what remote areas can receive radio signals from sender's transmitter.

➤ INSTANTANEOUS PREDICTION of radio transmission paths, a system developed by Raytheon, Waltham, Mass., in 1948 and held by the government in secrecy until now, was explained with motion pictures by Dr. J. T. deBettencourt by whom it was developed, at a joint meeting of the International Scientific Radio Union and the Institute of Radio Engineers held in Washington.

Formerly a member of Raytheon's research group and now a staff member at the Massachusetts Institute of Technology, Dr. deBettencourt supervised work that led to the discovery of a device which tells at a glance what remote areas can receive radio signals from the sender's transmitter.

Previously it has been necessary to make laborious mathematical calculations merely to obtain a less accurate approximation of the areas which could receive the signals.

Radio waves transmitted from the sender's station and reflected by the ionosphere scatter in all directions upon striking the ground at some distant point. It is these ground-scattered waves that indicate the reception area. Some of the scattered signals return to the sender's station. In the experimental work to assure certainty of results, radio beacons triggered by the scattered waves were employed. These sent tell-tale signals back to the sender's station.

Dr. deBettencourt detected the reflections with a radio receiver and electronically plotted them in terms of distance and direction on the screen of a cathode-ray oscilloscope, the "picture tube" of television sets. The results showed a region of no reception, surrounding the sending station, beyond which was an irregular circular, or partially circular, reception area, then a non-reception area again.

The picture he obtained on the screen showed what areas up to 3,000 miles away could receive his signals. The bright areas on the screen could receive the radio waves, the dark areas could not.

To make certain the returning signals were scattered by the ground rather than by elements in the atmosphere, Dr. deBettencourt and his group used radio beacons situated at various places throughout

the United States to transmit a radio pulse of their own after receiving his pulse. The beacon pulse was given a slight time delay and observed on the screen of a different oscilloscope. He thus obtained proof that scattering of the sender's radio signal occurred on the ground and not in the atmosphere as some persons had contended. To him that meant the device could be used to predict radio transmission paths to ground stations.

Such a device can be useful to persons who must rely upon radio for communication to distant points. Continually changing conditions in the atmosphere often block radio waves. The new device aids the sender in finding the best frequencies and times of day for communicating with remote stations.

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PHYSICS

Funnel Aids Auroral Glow

➤ A GIANT, but invisible, funnel acts as the passageway through which solar particles flow to give the aurora borealis, or northern lights, its luminescent glow, occasionally seen in the United States.

This was the theory presented to the National Academy of Sciences meeting in Washington by Dr. Donald H. Menzel, professor of astrophysics at Harvard University. Great clouds of ionized gas, he said, shot free from the sun and breaking through the unseen barrier of the earth's magnetic field, may cause the aurora.

This ionized gas is mostly hydrogen, and within the great clouds are clumps of denser gas, many of these clumps being larger than the earth. As the great gas clouds near the earth, they bump into the invisible magnetic lines of force that envelop our planet. This impact divides the clouds and causes most of them to flow around the earth. Sometimes, however, a particularly dense clump in the cloud will bend the magnetic lines. If the gas clouds keep piling into the dimple, or depression, thus formed, the magnetic lines may be pushed back into the shape of a great funnel, its small end resting on the earth.

When the solar ions and electrons pour through this giant invisible funnel into our atmosphere, there are the most intense occurrences of the aurora borealis, Dr. Menzel believes. The visible glow of the northern lights comes chiefly from the oxygen atoms in our atmosphere which become luminescent when struck by charged particles from the sun.

The energy that such a great gas cloud pours into the auroral regions, Dr Menzel reported, is comparable to that received during the day from the sun.

Dr. Menzel's funnel theory is an extension of work done by Dr. Sydney Chapman of Cambridge University, England, and Dr. D. F. Martyn of Australia. Dr. Chapman showed that the earth's magnetic field has little effect on solar particles until they come quite close, when the magnetic lines of force act as a bumper routing their flow around our planet.

Dr. Martyn extended this by proposing that the particles spill over the northern and southern edges of the field to cause the auroral zones.

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GENERAL SCIENCE

Academy Elects Members

➤ THIRTY MEMBERS, three foreign associates, a treasurer and two new members of the Council were elected at the National Academy of Sciences annual meeting in Washington.

The newly elected members of the Academy are:

Fuller Albright, associate professor of medicine, Harvard Medical School; Richard M. Badger, professor of chemistry, California Institute of Technology; Horace R. Byers, chairman of department of meteorology, University of Chicago; Claude Chevalley, professor of mathematics, Columbia University; G. M. Clemence, head astronomer, U. S. Naval Observatory; L. R. Cleveland, professor of zoology, Harvard University; Joseph S. Fruton, professor of biochemistry, Yale University School of Medicine; Crawford Hallock Greenewalt, president of E. I. du Pont de Nemours and Company, Inc.; D. T. Griggs, professor of geophysics, Institute of Geophysics, University of California at Los Angeles; Sterling B. Hendricks, chief chemist, Bureau of Plant Industry, Soils and Agricultural Engineering, U. S. Department of Agriculture; H. H. Hess, head of department of geology, Princeton University; C. L. Hubbs, professor of biology, Scripps Institution of Oceanography, LaJolla, Calif.; William S. Johnson, professor of organic chemistry, University of Wisconsin; Berwind P. Kaufmann, department of genetics, Carnegie Institution of Washington; Clyde K. M. Kluckhohn, professor of anthropology, Harvard University; Donald B. Lindsley, professor of psychology, University of California at Los Angeles; Philip D. McMaster, member of the Rockefeller Institute for Medical Research; Carl Niemann, professor of organic chemistry, California Institute of Technology; Chaim L. Pekeris, member of the Institute for Advanced Study, Princeton, N. J.; Norman F. Ramsey, Jr., professor of physics, Harvard University; Emilio Gino Segre, professor of physics, University of California; Robert Serber, professor of physics, Columbia University; F. H. Spedding, head of department of physical chemistry, Iowa State College; Lyman Spitzer, Jr., director of Princeton University Observatory; G. Ledyard Stebbins, Jr., professor of genetics, University of California; E. L. Tatum, professor of biology, Stanford University; Victor F. Weisskopf, professor of physics, Massachusetts Institute of Technology; John A. Wheeler, professor of physics, Princeton University; J. W. Williams, professor of chemistry, University of Wisconsin; and D. W. Woolley, member of the Rockefeller Institute for Medical Research.

New foreign associates elected are: Niels Bjerrum, professor of chemistry, Royal Veterinary and Agricultural College, Copenhagen; Tadeus Reichstein, director of organic laboratories, University of Basel; and Harald Ulrik Sverdrup, director of the Norsk Polarinstitutt, Oslo.

Dr. William J. Robbins, director of the New York Botanical Garden, was reelected treasurer for a four-year term. Dr. Robbins has served in that capacity for the past four years.

In addition to the treasurer, other officers of the Academy, all of whom are members of the Council, are: president, Detlev W. Bronk; vice president, Edwin Bidwell Wilson; home secretary, Alexander Wetmore; foreign secretary, Roger Adams.

Dr. Robert F. Loeb, professor of medicine, College of Physicians and Surgeons, New York, and Dr. W. M. Stanley, chairman of the department of biochemistry, University of California, Berkeley, were elected to membership on the Council of the Academy to serve for three years. Other members of the Council are Drs. Jesse Wakefield Beams, O. E. Buckley, Walter S. Hunter, William W. Rubey, and E. C. Stakman.

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METEOROLOGY

Predict Cool May For Both Coasts

➤ ABUNDANT SHOWERS along the coastal regions of Washington, Oregon and New England, but less than the usual amounts of rainfall in the northern half of the nation from the Rockies to the Appalachians are predicted for the rest of May.

The Weather Bureau's Extended Forecast Section also says that the rest of the nation can expect the usual amounts of rain from now until June 1.

The great plains area can expect warmer than usual weather with the northern parts of the plains going up farthest from the seasonal normals. The Atlantic and Pacific seaboards, however, will have cool May weather, while the conditions for the rest of the nation will be about as usual.

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MEDICINE

False Syphilis Test Shows Other Serious Ills

➤ THE FALSE positive test for syphilis, when it continues time after time in the same person, is far from harmless as medical scientists have heretofore thought.

It may be the first sign of serious underlying disease, Drs. C. F. Mohr and J. E. Moore of the Johns Hopkins Hospital and Medical School, Baltimore, declared at a Venereal Disease Symposium held in Washington under the auspices of the U. S. Public Health Service and the American Venereal Disease Association.

Among 51 patients so far examined who for months and years continued to have false positive blood tests for syphilis, these doctors discovered cases of Hodgkin's disease, sarcoid, rheumatoid arthritis, an anemia called Gaucher's disease and the skin disease, disseminated lupus erythematosus.

Of the group, only six showed no signs of disease or abnormality other than the chronic false positive reactions for syphilis. Fourteen of the patients were normal clinically but their blood showed a distinctive chemical pattern of abnormalities which all occur regularly in disseminated lupus. The abnormal blood chemistry of these 14, the Hopkins doctors said, may represent very early stages of the disease and further prolonged observation of the patients is essential.

The conditions doctors call collagen diseases, particularly lupus, rheumatoid arthritis, periarteritis and rheumatic fever, may be closely related to the biologic false positive phenomenon. If further study shows this to be true, more knowledge of the early signs of these diseases and of their natural history may be obtained.

Science News Letter, May 10, 1952

ARCHAEOLOGY

Find 3,000-Year-Old Flood Control and Irrigation Works

➤ ANCIENT ARABIA, a thousand years before the birth of Christ, had flood control and irrigation devices far superior to anything they have in that region today. This is among the finds of the American Foundation Arabian Expedition described to the American Philosophical Society meeting in Philadelphia.

Because of the excess of mud, the ancient people of Qataban did not use storage dams, Dr. W. F. Albright of Johns Hopkins University reported. Their water came in raging torrents in the monsoons. It was caught and turned aside by deflector dams into canals. Weirs and sluices then directed the water onto the land for irrigation. Wherever there was a weir, there was a dike of stone which was a fine piece of engineering, Dr. Albright said.

One extremely important achievement of the expedition, Dr. Albright said, was the successful working out of dates for the finds. Study of several thousand inscriptions made it possible for archaeological "handwriting experts" to develop a system for dating an inscription by the way the letters were formed. The beginning of inscriptions at Qataban occurred 1,000 years before Christ. The first settlement was 1,500 B.C.

Letters in the Southern Arabian alphabet were arranged in nearly the same order that the Abyssinian and Ethiopic alphabet used 1,500 years later. It is different from the alphabet we use, however.

A single mound was excavated clear down to the bottom of bedrock. The pottery of each layer was laid aside and studied separately. The trip down through 50 feet of depth of the mound carried the archaeologists backward in time to 1,000 years before Christ. By arranging samples of each pottery layer in order they were able to construct a pottery calendar by which other finds in the area can be dated over a period of 2,000 years or more of time.

Evidence was found for the earliest foreign commerce of the region, dating back to six centuries before Christ. The people exchanged goods at first with Egypt and Babylonia and later with Greece and Rome.

Science News Letter, May 10, 1952

MEDICINE

Sludged Blood Clue To Multiple Sclerosis

➤ SLUDGED BLOOD and molecules of fatty proteins in the blood serum are providing new clues to the cause of the incurable nerve disease, multiple sclerosis, it seems from studies reported to the American Academy of Neurology meeting in Louisville, Ky.

Sludging of the blood, or packing together of the red cells in the blood vessels, was found in a group of multiple sclerosis patients studied by Drs. L. Roizin, R. Abel and F. Winn of New York. This sludging, they believe, might cause multiple sclerosis because it deprives nerve cells of oxygen.

Multiple sclerosis is a condition in which the myelin sheath of nerves is damaged or destroyed. Whether the patient has trouble in seeing or in bladder control or in use of his muscles, or any of the other symptoms of the disease, seems to depend on which nerves are damaged.

The molecules of fatty protein were increased in the blood of multiple sclerosis patients in an active stage of the disease, Drs. Robert B. Aird, John W. Gofman, Hardin B. Jones, M. Brent Campbell and Bill C. Garoutte of the University of California School of Medicine reported. They believe that the increase in these molecules is related directly or indirectly to the cause of the demyelinating process.

Science News Letter, May 10, 1952

IN SCIENCE

MATHEMATICS

New Tables Contain Logs Computed to 23 Places

➤ SCIENTISTS HAVE another mathematical tool in the new Smithsonian Institution logarithm tables just available.

They make it possible to save time in calculating the logarithm of any number up to 99,999,999,999,999,999,999,999 (99 sextillion). And it can be done to an accuracy of 23 places. The new tables totalling 400 pages use the factorization method of computing logarithms.

The usefulness of logarithms, which youngsters learn about in high school, is that multiplication and division can be turned into addition and subtraction, while squaring and taking roots becomes multiplication and division. The slide rule works because it is laid off on a logarithmic scale.

The logarithm of a number is the power to which a base must be raised to equal the number. Both e, which is 2.718281828, and 10 are bases used in the new tables.

The tables were prepared by George W. Spenceley, Rheba M. Spenceley and Eugene R. Epperson, all of Miami University at Oxford, Ohio, and have just been published by the Smithsonian Institution.

Science News Letter, May 10, 1952

AERONAUTICS

Wax on Windshield Provides Clear Vision on Jet Planes

➤ THREE FILMS of three different kinds of wax are being successfully used on the windshields of British jet-fighters to provide clear vision for the pilots in rain and in making carrier deck landings in spray.

The films are water repellent. They cause the water landing on the glass to spread and flow down the glass in a sheet so even and continuous that it does not interfere with vision. The film coatings provide jet pilots with the best method yet found in England to have clear vision in rainy weather. The principal disadvantage of the wax films is that they wear off in about three weeks time and new coatings have to be applied.

Conventional airplanes equipped with ordinary propellers do not require this windshield coating of waxes. The propellers themselves blow the water off. Also such planes usually travel at a slow enough pace to permit windshield wipers to be used. At the speed with which jet fighters travel windshield wipers are torn off. The wax coatings are the best solution yet.

Science News Letter, May 10, 1952

ENCE FIELDS

BACTERIOLOGY

Microbes Have Sex Life Growing in Blood

➤ SEX LIFE becomes possible for certain microorganisms when they are grown in human blood, it appears from studies reported by Drs. M. E. Hunter and E. D. DeLamater of the University of Pennsylvania at the meeting of the Society of American Bacteriologists in Boston.

The microorganism they studied is called *Bacillus megaterium*. Sexual fusion of these microorganisms has previously been reported. Now the scientists have reported how the chemical composition of the material the microorganisms grow on influences their fusion.

Bloods from animals and humans, sugars, B vitamins and the protein building blocks known as amino acids were tested. Glucose, among the sugars tested, had a definite inhibiting effect, as judged by secondary colony formation. Certain other sugars and the B vitamins encouraged secondary colony formation. This colony formation presumably results from offspring of the fused microorganisms.

Of all the bloods tested, human blood was the only one on which sexual fusion of the microorganisms was detected by examination of the microorganism cells under the microscope. The fusion-inducing factor was localized in a special part of human blood serum known as Cohn's Fraction III.

Without protein or its building blocks, the amino acids, no secondary colonies are formed, indicating no fusion has taken place.

When the bacteriologists tried synthetic material for the microorganisms to grow on, they found certain amino acids had a stimulating effect on fusion.

Science News Letter, May 10, 1952

HOME ECONOMICS

Broom Still Popular Equipment in Farm Homes

➤ MODERN DESIGN and the machine age still have not replaced the old fashioned broom as the most popular piece of cleaning equipment in the farm home.

Miss Helen C. Potter, University of California housing research specialist, reported that of the 2,639 homemakers who answered a questionnaire on the frequency of use of cleaning equipment, 2,069 use the broom daily in their work about the house, while only 382 use the vacuum cleaner.

The survey showed that over 93% use the broom at least once a week, while only 80% of the homemakers use the vacuum cleaner at least once a week.

The study also revealed that the California rural housewife was more apt to use her carpet sweeper than her vacuum cleaner when she owned both pieces of cleaning equipment.

Dust pans got the nod for being the second most frequently used piece of cleaning equipment but of the 2,069 who use brooms daily, only 1,524 housewives use the dustpan daily.

The study was conducted as an attempt to gain information that can be useful in improving the design of closets for the storage of cleaning equipment.

Miss Potter reported that the frequency with which the broom, dry mop, vacuum cleaner, vacuum cleaner attachments, wet mop, dust pan and carpet sweepers are used, demonstrates the need for storage in a convenient and accessible closet.

Science News Letter, May 10, 1952

RADIO

New Television Stations To Be Built Farther Apart

➤ HUNDREDS of new television stations will probably be built throughout the country within the next decade or two. Those operating on the same channel will undoubtedly be placed farther apart than such stations built in the past.

The increased distance between television stations results from the fact that broadcasts can be seen and heard much farther than the line-of-sight distance originally estimated. Broadcasts from stations too close together interfere with each other and the two programs are superimposed.

Radio experts for several years have been striving to determine just why very high frequency, VHF, and microwave radio waves are nearly always heard even when the broadcasting station is well below the horizon. Their experiments and theories were presented and discussed at the joint meeting of the International Scientific Radio Union and the Institute of Radio Engineers.

Those reporting on their researches were Dr. Thomas J. Carroll of Massachusetts Institute of Technology, Dr. Joseph Feinstein of the National Bureau of Standards, Martin Katzin of the Naval Research Laboratory, and L. J. Anderson and J. F. Colwell of the Navy Electronics Laboratory.

These and other experts in the theoretical field do not agree as to why or how the upper atmosphere reflects these radio waves well beyond the horizon. The three most-generally accepted explanations are:

1. Radio waves are scattered by winds and other movement in the upper atmosphere.
2. Roughness of the earth's surface is responsible for some wave scattering.
3. Radio waves are reflected not just by the atmosphere's "radio roof," but also by the gradual change in the density of the upper atmosphere.

Science News Letter, May 10, 1952

MEDICINE

New Form of Antibiotic Is Better for Syphilis

➤ CHLOROMYCETIN PREPARATION not yet on the market is proving effective in curing syphilis and four other venereal diseases.

The new preparation is for intramuscular injections. Preliminary trials of it were reported by Drs. Sidney Olansky, Fred Harb, and Willie Simpson of the U. S. Public Health Service's venereal disease laboratory at Chamblee, Ga., at the Venereal Disease Symposium held in Washington under the auspices of the U. S. Public Health Service and the American Venereal Disease Association.

So far, 71 patients with early syphilis have been treated with no failures, although there were two reinfections. The syphilis germs disappeared from syphilitic sores in the average time of 22.8 hours.

One patient had gonorrhea with syphilis and the gonorrhea was cured while the patient was being treated for syphilis.

The new chloromycetin was used to treat 26 patients with granuloma inguinale and 16 with chancroid, with no failures. Five patients with lymphogranuloma venereum were treated and all improved clinically.

Science News Letter, May 10, 1952

PHYSICS

Light Helium Isotope More Ordinary Liquid

➤ A RARE and lighter-weight helium is not so strange, even though it is "twin" to one of the world's strangest liquids, ordinary helium liquefied. Ever since the discovery of the extraordinary superfluidity of ordinary helium 4, when cooled to near absolute zero temperature, scientists have wondered whether the other variety or isotope of helium, weight 3, is also a queer liquid.

A team of scientists from the Argonne National Laboratory, Chicago, told the National Academy of Sciences meeting in Washington that sufficient quantities of pure helium 3 have been manufactured by nuclear transformations to allow the investigations. The theory has been that the lighter helium isotope follows one kind of theoretical statistics, the Fermi-Dirac formulation, while helium 4 follows the Bose-Einstein statistics, which explains the phenomenon of flowing where it would seem impossible for any normal liquid to go.

Drs. Darrell E. Osborne, Bernard M. Abraham and Bernard Weinstock found that liquid helium 3 acted normally, but it does have the remarkable property of remaining liquid when cooled to absolute zero, unless a high pressure is applied, just as is the case with ordinary helium. The viscosity, however, increases as the temperature is lowered.

Science News Letter, May 10, 1952

METALLURGY

Unusual Metals Go to Work

Little-known metals with strange names, formerly laboratory curiosities, are now finding practical applications, improving common metal alloys or in metallic form.

By A. C. MONAHAN

➤ LITTLE-KNOWN metals are now coming into use — molybdenum, zirconium, selenium, hafnium. Their names are not yet familiar to the man on the street or even the workmen in metal-producing industries.

There is more than a score of such metals, almost unknown outside of laboratories because they are little used. Uses have been a long time developing because the metals are hard to separate from their ores.

Much research is now being done on them because they help to improve properties of common metals. For some, applications for the metals themselves have been found.

These little-known metals, minor metals they are often called, are not necessarily scarce. For instance, they include titanium which is the fourth most plentiful metal in the crust of the earth and the ninth most plentiful chemical element. Its compounds have long been used. Titanium dioxide is one of the principal pigments employed to make white paint white.

The metal itself, which has great possibilities in construction work, has been little used until recently because economical methods of obtaining it from its ores were unknown. Now, however, it is being produced commercially and is suitable for many applications.

Used in Alloys

Many of these less familiar metals will be used only in alloys with common metals to give the latter improved properties, and their names will not come into general use. Nevertheless, workmen in the plants where the alloys are produced will need nicknames. In some plants aluminum and magnesium are called "Al" and "Mag." Molybdenum-steel alloys are called moly-steels. Chrome steel is an alloy of steel containing chromium. In fact, chrome is widely used as an abbreviated name for chromium in various alloys.

Titanium is not a difficult name and need not be abbreviated. It promises to become as well known in the next decade or so as aluminum and magnesium are now. It will be used in alloys and also in metal form.

Methods of getting it in metallic form from its ores have been developed during the past decade by the U. S. Bureau of Mines and by private industries and some 1,000 tons are now being produced in the United States annually. More economical methods will undoubtedly follow soon; then titanium will take its proper place among the structural metals of the world.

Titanium is said to be as near an all-purpose metal as any we already have. It is as strong as steel but far lighter. It has high resistance to corrosion from moisture, salt air and many chemicals. These properties make it particularly suitable for aircraft engines and air frames. Unalloyed titanium is said to be more resistant to projectiles than any armor plate now in use.

Molybdenum is another plentiful metal. In the past decade or two it has come into wide use in steel alloys. "Moly" is a good nickname. Its full name is difficult to pronounce but pronunciation is made easier by dividing it into syllables (mo-lyb-de-num) and remembering the accent is on the "lyb".

An important point about molybdenum is that it is plentiful in the United States. America produces about 30,000,000 pounds a year, which is approximately 85% of the total world production. Some 70% of the metal produced is used in the steel industry. It increases the tensile strength of steel and also increases its resistance to corrosion.

A plentiful supply of molybdenum decreases the need for tungsten, a metal for which America relies on imports. It can be used as a substitute for tungsten in some applications such as in high-speed cutting tools. It has a high melting point, 4,760 degrees Fahrenheit, which gives it special value in alloys to withstand high temperatures.

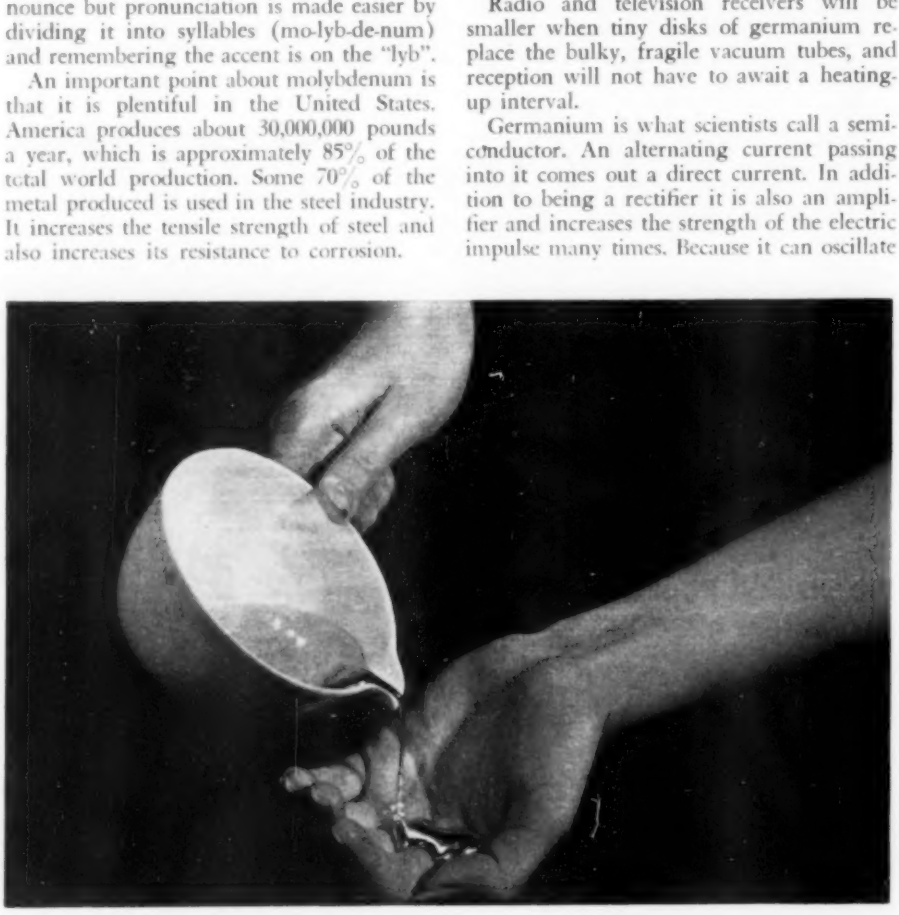
Molybdenum is now in use in the superchargers that make it possible for airplanes with conventional engines to function in the thin air of high altitudes and in the turbo-jet engines that power jet planes.

Big Future for Germanium

Germanium is a metal which the public will hear a lot about in the future because it will play an important part in electronics and may replace vacuum tubes in radio and television sets. It is one of the minor metals and is produced only in very limited quantities, mostly as a by-product in zinc smelting.

Radio and television receivers will be smaller when tiny disks of germanium replace the bulky, fragile vacuum tubes, and reception will not have to await a heating-up interval.

Germanium is what scientists call a semiconductor. An alternating current passing into it comes out a direct current. In addition to being a rectifier it is also an amplifier and increases the strength of the electric impulse many times. Because it can oscillate



POURING MOLTEN METAL—Since gallium, a little known metal, melts at 85 degrees Fahrenheit, it is perfectly safe to pour the molten metal into the palm of a hand, as shown here. Gallium remains a liquid up to about 3,600 degrees and may some day be used for military devices.

as well as amplify, it can be used to produce standard frequency tones and for other use.

Among other little-known metals already in use in engineering are zirconium, tantalum, columbium, vanadium and hafnium. The public will have little occasion to use these names as these metals will find their greatest uses in alloys and in special manufacturing.

Zirconium Quite Common

Zirconium is not a rare metal, being more common in the earth than copper, nickel and lead. But it is hard to separate from its ores and even when separated usually contains hafnium in quantities of from one-half to three percent. For most purposes the presence of the hafnium is not objectionable.

However, in the construction of atomic piles for the atomic energy program, in which most of the zirconium now produced is used, a low hafnium content is needed. zirconium and has somewhat similar prop- it has a low thermal neutron absorption coefficient.

When more zirconium is produced, it will have a special application in corrosion-resisting alloys, particularly for equipment used with hydrochloric acid. The metal hafnium, which is not available commercially as yet, occurs in nature associated with zirconium and has somewhat similar properties.

Tantalum and columbium, the latter known as niobium in some parts of the world, are usually found together in the same mineral and they have similar properties. Separation is a chemical process, carried out with difficulty. An interesting use of tantalum is in surgery, such as in skull plates and surgical wire, because of its resistance to corrosion from chemicals in the human body.

Tantalum Resists Corrosion

Corrosion resistance is one of tantalum's outstanding properties and the one for which it is most widely used. Another important application is in radar and other electronic tubes. Its oxides and carbides are used in high-speed cutting tools. In laboratories, tantalum substitutes for platinum alloy in certain types of utensils.

Columbium in stainless steel improves the alloy's weldability, creep strength, impact strength and corrosion resistance. The metal is a component part of certain permanent magnet alloys, and it is also used in electronic tubes which are subjected to severe service.

Vanadium can not be regarded as a rare metal because it is widely spread and is as plentiful as nickel and zinc. Annual production in the United States is over 2,000,000 pounds a year, much of which is taken by the Atomic Energy Commission for purposes not revealed. In the form of ferro-vanadium, the metal is used in the manufacture of tool steels, engineering steels, high-strength structural steels and special wear-resistant cast irons.

Important in the list of minor metals now finding wider application are lithium, which is only half as heavy as water, beryllium, gallium, indium, boron, cerium, cesium, selenium, tellurium and thallium.

Lithium is used to a slight extent in hardening copper, lead, aluminum and magnesium alloys. Its more common applications, however, are in its chemical compounds.

Beryllium is an important minor metal and would have extensive applications except that the supply is quite limited. It has an outstanding ability to improve mechanical properties of alloys when added in small proportions. Beryllium also is corrosion resistant and seems to have the ability to make the metals with which it is alloyed more able to resist corrosion.

Boron Adds Hardness

A tiny bit of boron, basis of borax, adds hardness to steel. The principal application of cerium is in sparking flints for cigarette lighters, but it is also used in electronic tubes, and its oxide helps to make gas mantles glow.

Cesium, sometimes spelled caesium, is used in photoelectric cells because it gives up one electron more readily than any other element.

The principal application of indium is in heavy-duty composite metal bearings, although it is also added to solder and brazing alloys to give a low-melting alloy.

A valuable property of selenium is its change in electrical conductivity when exposed to light. For this reason it is used in the so-called electric eyes which not only make doors open automatically, but also help to sort, count and scan a wide variety of things, from money to tin cans. Selenium can also rectify electric currents.

Both selenium and tellurium improve copper alloys. Tellurium is used to tone silver prints.

The chief application of thallium has been as a rodent poison in grains, but there is a present interest in some of its compounds. One of these will transmit wavelengths in the infra-red region and was used in sniperscopes during the war to detect enemies prowling about in the night by the heat given off from their bodies.

Science News Letter, May 10, 1952

TECHNOLOGY

New Brick Lowers Cost Of Masonry Dwellings

➤ A COST-CUTTING brick which should bring masonry dwellings within the pocketbook range of more persons has been introduced by the Structural Clay Products Institute in Washington.

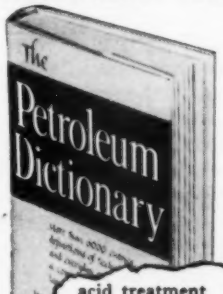
Robert B. Taylor, director of research for the Institute, reported that the new SCR brick could be used to build one-and-a-half story houses at a price competitive with high-quality frame dwellings of the same size.

A five-room pilot house was built using the new brick in the outside walls. The brick's performance was satisfactory and acceptable under major national building codes.

Actual construction tests under normal conditions showed that a mason can build from 60% to 100% more wall area per day using the new brick. That equals about 100 square feet of wall per day. This figure is considered conservative by the Institute.

Science News Letter, May 10, 1952

At last—the *petroleum* industry has a *dictionary* of its own



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ENTOMOLOGY

Two Weak Insecticides Kill Like Strong One

➤ A COMBINATION of two weak insecticides will give just as high a kill of insects as one strong one. And the amount of each of the deadly chemicals that should be used to get the desired lethal effect can be figured out by a mathematical formula.

Two scientists at the Connecticut Agricultural Experiment Station, New Haven, Conn., investigated the killing power of two combined chemicals during tests to find some way of reducing the chances of insects building up resistance to insecticides. This serious problem was first noticed when DDT became less and less effective for fly control.

Insects resistant to one chemical are not necessarily resistant to all of them, thus two soft blows can be more deadly than one knockout punch. Dr. Raimon L. Beard and Neely Turner are now trying to find the right combinations of insecticides for commercial use against specific insects.

The new mathematical formula for working out just how much of each of two different insecticides to use for maximum effectiveness has been suggested in a report in NATURE, British scientific journal. Drs. P. S. Hewlett of the Pest Infestation Laboratory, Slough, Bucks, and R. L. Plackett of the department of applied mathematics at the University of Liverpool, state that further tests will be needed before they can be sure that the new equation, a modification of a previously used formula, is absolutely corrrect.

The two Connecticut scientists, Dr. Beard and Mr. Neely, also found that insects vary over a period of time in their resistance to insecticides. One day an individual insect may be highly resistant to an insecticide and, a few days later, may be easily killed by it. Thus the only sure means of a true resistance being built up by the insects is to expose them constantly to a killing chemical for a long time. Not using chemicals that remain toxic for a long time after application, Dr. Beard says, would be one way to avoid the build-up of resistance to insecticides by insects.

Science News Letter, May 10, 1952

Attention Physics Instructors
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ORNITHOLOGY

NATURE RAMBLINGS

The Crow

➤ THE AMBITIOUS gardener who wants an early crop of sweet corn has to contend with many troubles, not least among which is the crow.

No sooner do the first tiny sprouts appear above the soil than this bold black thief goes hopping along the row, pulling up plant after plant, and swallowing the seed kernel still clinging to the roots.

The crow is a choosy rascal. He does not want hard, dry corn—won't touch it if there are bushels of it lying about. What he wants is the soft, sweet grain with its starch turned to sugar by the digestive processes going on during the sprouting. For the same reasons he may later raid the corn patch while the ears are soft and green but lets it alone when they begin to get ripe and hard.

But for all his thievish habits that must make him seem the very embodiment of Satan to the enraged gardener, the crow has redeeming traits. Corn is about the only crop he troubles and it is not the major portion of his diet.

Like all other birds he feeds mainly on insects. June bugs and cutworms in the early summer and grasshoppers in August are his staples, though many another enemy of the gardener goes into his ample interior.

In addition to two or three smaller forms of the true crow found in this country, a quite distinct species, the fish crow, is abundant along the Atlantic and Gulf coasts. He is a smaller bird than the common crow, weaker in flight and in voice and in general he is not so cheerfully noisy a ruffian as the more familiar cornfield nuisance.

The crow, *Corvus brachyrhynchos,* has probably had more work done and more pages written about it than any but a few other wild birds, Dr. Paul W. Parmalee, department of wildlife management, Texas A. and M. College, reported recently in the American Midland Naturalist.

"Because of the bird's large size, black plumage, cunning, apparent intelligence, and great abundance," he states, "it had become one of the best known birds in this country." And because of its economic importance to man, there has been considerable controversy over whether the bird should be destroyed, left alone or protected.

Dr. Parmalee studied the growth, development and behavior of the nestling crow, because such information is important in understanding the adult bird and how its behavior affects man and other organisms with which it comes in contact.

Science News Letter, May 10, 1952

MEDICINE

Polio Immunity Test

➤ DOCTORS NOW will be able to tell, through a fairly simple and inexpensive test, whether a child who feels a little sick during the polio season is infected with the virus of the disease. The same test will also tell whether a child or grown-up is immune to the disease.

The test was announced by Drs. Nada Ledinko, Joseph L. Melnick and John T. Riordan of Yale School of Medicine at the meeting of the Federation of American Societies for Experimental Biology in New York.

The test is made with testicular tissue from monkeys. This tissue, the scientists discovered, will grow in test tubes containing nourishing fluids. After several days each piece of tissue will have long strands of cells on its outer surface that can be seen under the microscope. When samples of material such as throat swabbings or fecal material are added to the testicular tissue, the long strands of cells are destroyed if the material contains the poliomyelitis virus. If there is little or no virus present, the strands continue growing.

To test for immunity to polio, a blood sample is added to the tube containing monkey tissue culture and to this is also added known polio virus. If the person is immune, the antibodies in his blood will stop the polio virus and the long strands of tissue cells will go on growing as if no virus was present.

Advantages of this test over the one used heretofore are that one monkey can be used for 150 tests, instead of for a single test, and there is no need to wait several weeks to see whether the monkey gets polio. Time, money and work keeping the test animal healthy are thus saved.

Science News Letter, May 10, 1952

PSYCHOLOGY

Language for Insects?

Honeybees may use real abstraction, just as humans do, in communicating information, since they relate direction to sun's position.

➤ SCIENTISTS ARE worrying about whether honeybees, ants and termites tell each other things the way we humans do.

The honeybee dancing her figure of eight dance to tell the direction and distance of a new source of nectar may be using a kind of language. Ants may have a kind of language for declaring the wars they wage or giving directions about the so-called gardens they raise and the livestock they cherish. Termites may even have a language of love, since they live in a fully two-sexed society.

On the other hand, the bees whose method of communication has been studied most, may after all come closer to the setter pointing a bird. The setter uses what scientists call a pseudo-abstraction. He points directly toward the bird.

The honeybee seems to use a real abstraction, just as humans do. Instead of pointing directly, she uses the more indirect method of telling a direction by relation. She turns the axis of her dance 60 degrees to the left of the sun if the new source of nectar is in a line running from the hive 60 degrees to the left of the sun. In other words, she relates the direction to the position of the sun.

The bee's abstraction is a symbol, just as the word horse is our symbol for the animal, and it is just as arbitrary, Dr. A. L. Kroeber of Columbia University, New York, declared at the meeting of the National Academy of Sciences in Washington.

Of course, he pointed out, it may be that the honeybee only seems to us to use abstractions and symbols. The real problem is: How do the bees learn the symbols? Do they teach each new generation, as human parents teach a child the word, or symbol, for horse? Or is the bee knowledge of how to tell each other a few fundamental and vital facts transmitted with the genes that are handed on from one generation to another?

Solution of the problem might come, he suggested, from observing the pupae as they emerge, to see whether they are born, as it were, with the faculty of understanding bee language or whether they must be taught it.

Dr. Kroeber, who is an anthropologist, said he would not dare to carry out the necessary experiments because bees are so hard to handle. He thinks these must be made by someone who knows bees, such as Dr. Karl von Frisch, the German scientist whose 40-year studies of bees have "opened a brilliant and promising path" for future research on the social insects, including the ants and the termites.

Science News Letter, May 10, 1952

AERONAUTICS

Carbon Brush Wear Poses Serious Flight Hazard

➤THE STRATOSPHERIC wearing of carbon brushes not only puzzles scientists but also creates a hazard for airplanes flying six or more miles high, the Society of British Aircraft Constructors report in London.

Carbon brushes are small blocks of compressed carbon which are used to feed electric current into some motors or to take it from electric generators. Usually they wear very slowly, lasting for years, but at stratospheric heights they may wear down at the rate of one-half an inch each hour.

When completely exhausted, electrical contact is broken and the motor will stop or the power supply will fail.

Although scientists know what happens to the brushes and are findings ways of stopping it, they are not agreed as to why it happens. Apparently the stratosphere's low moisture content, less than one one-thousandth of that at ground level, is partly responsible.

Scientists figured that high-flying planes would have to carry about 570 pounds of water with them to supply the proper amount of moisture to carbon brushes. But in view of the excessive weight, they decided some other way of reducing carbon brush wear had to be found. However, the scientists did not comment further.

Science News Letter, May 10, 1952

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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N. W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

AGES IN CHAOS: Volume I, From the Exodus to King Akhnaton—Immanuel Velikovsky—*Doubleday*, 350 p., illus., $4.50. The author presents his own theories of Egyptian and Palestinian history.

ALL ABOUT TELEVISION—John Derby—*Popular Mechanics Press*, 171 p., illus., $3.00. If you have the courage to tinker with your television set, this book is intended to save you money on repairs. It will also help you in the selection of a new set and aid you in understanding the troubles that may arise.

THE AMERICANA ANNUAL 1952—John J. Smith and others, Eds.—*Americana*, 869 p., illus., $10.00. A general reference yearbook describing the stirring events of 1951.

THE ATMOSPHERES OF THE EARTH AND PLANETS—Gerard P. Kuiper, Ed.—*University of Chicago Press*, rev. ed., 434 p. illus., $8.50. Contributors to the 1947 symposium were invited to revise their papers for this new edition. The revisions turned out to be extensive and bring the material up to date as of 1951.

CAMPING FOR ALL IT'S WORTH—William E. Swanson—*Macmillan*, 154 p., illus., $2.95. Practical ideas to make camping enjoyable to boys and girls of any age, whether in the woods or in your own backyard, or even in the basement on a rainy day.

THE CAR OWNER'S FIX-IT GUIDE: A Complete Handbook to Automobile Operation, Maintenance and Repair—S. Palestrant and H. Schneider—*Fell*, 92 p., illus., paper, $2.00. Telling the driver in non-technical language and clear drawings and diagrams, how to know his car and make adjustments and minor repairs.

THE CHEMISTRY OF ORGANIC COMPOUNDS: A Year's Course in Organic Chemistry—James Bryant Conant and Albert Harold Blatt—*Macmillan*, 4th ed., 655 p., $5.90. New material has been added to this edition, especially in biochemistry and industrial chemistry.

THE CHILD AND HIS PLAY: A Planning Guide for Parents and Teachers—Hazel Kepler—*Funk & Wagnalls*, 309 p., $3.75. A wealth of suggestions for having fun with your children and helping them to have fun with you.

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COLOR IN BUSINESS, SCIENCE, AND INDUSTRY—Deane B. Judd—*Wiley*, 401 p., illus., $6.50. The key to color problems of the future, says the author, is to be found in visual psychophysics mixed with a liberal sprinkling of common sense. This volume presents visual psychophysics in practical terms based on 20 years of experience at the National Bureau of Standards.

THE CREATION OF THE UNIVERSE—George Gamow—*Viking*, 147 p., illus., $3.75. The third book of a trilogy dealing with the place of the sun among the stars, the place of the earth among the planets and, now, the universe as a whole—whether or not it had a beginning in time and has an end in space. Mathematics is relegated to an appendix.

DDT AND NEWER PERSISTENT INSECTICIDES—T. F. West and G. A. Campbell—*Chemical Publishing Co.* 1st American edition, 632 p., illus., $8.50. Telling of the physical and chemical properties and principal uses of the newest insecticides.

DANA'S MANUAL OF MINERALOGY—Revised by Cornelius S. Hurlbut, Jr.—*Wiley*, 16th ed., 530 p., illus., $6.00. Greatly revised because of the increasingly close relationship between mineralogy and chemistry and physics and the independent development of crystallography.

DEFORMATION, METAMORPHISM, AND MINERALIZATION IN GYPSUM-ANHYDRITE CAP ROCK, SULPHUR SALT DOME, LOUISIANA—Marcus I. Goldman—*Geological Society of America*, 169 p., illus., $3.00. The anhydrite cap rock forms on top of a salt stock by cementation of anhydrite freed from the salt as a result of solution of the salt by ground water.

DYNAMIC PSYCHIATRY—Franz Alexander and Helen Ross, Eds.—*University of Chicago Press*, 578 p., $10.00. Fifteen prominent writers contribute to this work describing the concepts of dynamic psychiatry, their contributions to clinical psychiatry and their influence on allied fields.

ENGINEERING SOIL SURVEY MAPPING—Highway Research Board—*National Research Council*, Highway Research Board Bulletin No. 46, 95 p., illus., paper, $1.50. Five papers of particular interest to highway engineers.

GLASS: A Handbook for Students and Technicians—J. Home Dickson, Ed.—*Chemical Publishing Co.*, 300 p., illus., $6.00. A reference book on the structure, composition, manufacture and applications of one of our commonest materials.

INTERNATIONAL REVIEW OF CYTOLOGY, Volume I—G. H. Bourne and J. F. Danielli, Eds.—*Academic*, 368 p., illus., $7.80. The first of a regular annual review service. Among the authors of the present volume are seven British, five Americans, one Dutch, one Danish and one Swiss. Each chapter is a review of a specific subject.

LIVING IN BALANCE—Frank S. Caprio—*Arundel*, 246 p., $3.75. The author believes that nervous breakdowns can be prevented by better understanding of the causes of emotional conflicts.

MANURES AND FERTILIZERS: A Survey by Ministry of Agriculture and Fisheries—*Chemical Publishing Co.*, 96 p., $2.50. To explain to farmers the principles of increasing soil fertility.

MECHANICS AND PROPERTIES OF MATTER—Reginald J. Stephenson—*Wiley*, 371 p., illus., $6.00. An attempt to give an appreciation of physical theory before involving the reader in mathematics.

MEN, MEAT, AND MIRACLES—Bertram B. Fowler—*Messner*, 245 p., $3.00. The romantic story of the meat packing industry written in refutation of Upton Sinclair's "The Jungle."

METHODS OF ANALYSIS OF FUELS AND OILS—J. R. Campbell—*Chemical Publishing Co.*, 216 p., illus., $4.00. A laboratory guide for students of fuel technology.

NORMAN HUNTER'S SUCCESSFUL MAGIC FOR AMATEURS—F. J. Camm, Ed.—*Arco*, 383 p., illus., $3.50. Simple, easily understood instructions for creating illusions that are difficult to understand.

OUT OF THE SKY—An Introduction to Meteoritics—H. H. Nininger—*University of Denver Press*, 336 p., illus., $5.00. Here is an authoritative book packed with information about the very young science, meteoritics, size of meteorites, their composition, historic falls, etc.

THE PETROLEUM DICTIONARY—Lalia Phipps Boone—*University of Oklahoma Press*, 338 p., $5.00. Containing about 6,000 words from "alligator lace" to "yo-yo stick" that make up the language of the oil field. Introductory chapters tell of the origin and development of the language.

PRIMER OF ELECTRONICS AND RADIANT ENERGY—Don Caverly—*McGraw-Hill*, 2d ed., 343 p., illus., $5.50. A book for laymen about the bases of so many modern inventions.

THE SECRET OF LIGHT—Irving Adler—*International Publishers*, 96 p., illus., $2.25. A book for children telling them many interesting facts about light.

THE STORY OF OUR TIME: Encyclopedia Year Book 1952—E. V. McLoughlin, Ed. in Chief—*Grolier Society*, 432 p., illus., $4.95. To keep you informed of all the important happenings of the past year. Contributed by various specialists.

A TEXTBOOK OF EVOLUTION—Edward O. Dodson—*Saunders*, 419 p., illus., $5.00. A book for undergraduates. It contains a section of prediction of what may develop in the future, including the effects of the wide use of radiation.

VARIATION IN SOME UNARMED HYMENOLEPIDIDAE (CESTODA) FROM RODENTS—Marietta Voge—*University of California Press*, 34 p., illus., paper, 75 cents.

Science News Letter, May 10, 1952

Needles of *evergreens* growing on mountain sides are good collectors of tiny water droplets and, in some cases, have been observed to drip moisture so fast that it actually was raining under the tree.

GENETICS

Immunity to Virus Ills

Inherited, genetic constitution may determine resistance to virus, basic, biologic studies with inbred mice and yellow fever virus strain show.

➤ WHETHER YOU will develop immunity to a virus when it invades your body or get sick and maybe die depends on your inherited, genetic constitution.

Resistance to a virus is inherited as a dominant in accordance with the Mendelian laws of inheritance, Dr. Albert B. Sabin of the University of Cincinnati Children's Hospital Research Foundation has discovered.

His findings, reported to the National Academy of Sciences meeting in Washington, were made with an inbred line of mice and the 17 D strain of yellow fever virus. But the phenomenon is a basic biologic one, true for humans as well as for mice and other animals. It does not show up as readily in humans because of the mixed genetic background of most human populations.

In some human populations, however, it does show up. In Africa, for example, certain tribes have immunity to the prevalent strains of yellow fever viruses. They do not get yellow fever, but white men going there, unless protected by vaccines, do get yellow fever and many have died of it. The African tribes evidently have the dominant gene for yellow fever immunity.

The discovery of a dominant gene for one yellow fever virus strain, 17 D, in an inbred line of mice was made accidentally in 1944. At that time Dr. Sabin was carrying on experiments on dengue fever, a menace to our troops in the Southwest Pacific. The problem was to see whether yellow fever vaccine would modify infection with dengue virus.

First step was to inoculate yellow fever virus into a strain of mice, to make sure it was active. The particular strain of mice he was using, called PRI, turned out to be 100% immune to the yellow fever virus strain under study. Not one of the mice got yellow fever.

This finding was surprising, and after the war, Dr. Sabin decided to look into it further. These inbred mice, he reported, have a dominant gene that makes them immune, after the first few days of life, to 17 D yellow virus, and also to the viruses of dengue, West Nile fever, Japanese B, St. Louis and Russian tick-borne encephalitis. But it is without effect on the viruses of western equine, eastern equine and Venezuelan encephalitis, poliomyelitis, rabies and a number of others tested.

The PRI mice also have an inherited, dominant susceptibility to another yellow fever virus strain, called the French neurotropic.

These genes for immunity and susceptibility apparently act through two different mechanisms: 1. control of the multiplication of the virus and 2. effect on the vulnerability of the body cells to the virus.

Further studies of the mechanisms of this genetic factor will, Dr. Sabin believes, show the mechanism by which chemical prevention of susceptibility to viruses can be achieved.

Science News Letter, May 10, 1952

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"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. Gerald Wendt, in charge of education in science, UNESCO, Paris, discusses "Science for the World."

INVENTION

Flat Tire Indicator Signals Motorist

➤ JOSEPH FRANKS of Lawrence, Mass., now deceased, has been granted patent number 2,590,394 for his invention of a flat tire indicator which signals a motorist of a flat tire by turning on a dashboard light.

The invention consists of two slightly curved tubes mounted near an automobile's axles. One tube is situated near the front of the car, the other near the back. Inside the tube are two smaller tubes and an electricity-conducting liquid which can move freely in the larger tube.

When a flat tire develops, one of the tubes becomes tilted and the liquid moves to one end. The liquid seeps through small holes in the inside tubes until it finally reaches a switch, closes it and causes a dashboard light to flash on. The invention can be so arranged that the flat tire indicator will report which tire is flat by turning on the proper one of four dashboard lights.

Science News Letter, May 10, 1952

ELECTRONICS

Portable Walkie-Lookie

➤ A PORTABLE television camera which may help to rush spot news to thousands of video screens while it is going on has been built and successfully tested by four research workers in the Radio Corporation of America's laboratories division, Princeton, N. J.

Describing the Walkie-Lookie in the technical journal RCA REVIEW (March), L. E. Flory, W. S. Pike, J. E. Dilley and J. M. Morgan reported that the unit was completely free of encumbering cables and wires to the control center because of its built-in power supply. The power unit is made up of batteries contained in a 50-pound pack carried on the operator's back. Engineers predict the self-contained power supply feature will cut time now required for television stations to set up equipment to cover spot news.

Housed in the pack are the tubes and circuits needed to transmit picture and voice. In operation, the Walkie-Lookie will transmit up to one-half a mile and for one and one-half hours. When covering events more than a half mile away from the broadcasting station, the unit will relay the picture and sound to a nearby mobile unit which will send it on to the station via microwave.

The camera somewhat resembles a home movie camera with a turret of lenses. The man operating the camera, however, would not be such a common sight. He would have wires running around his body and a dipole antenna projecting above his head.

Science News Letter, May 10, 1952

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PLASTIC BLOOD pack has been designed in which to collect, store and ship blood without danger of breakage and also to save space and cost. The pack can be sterilized at temperatures of 250 degrees Fahrenheit, and comes complete with needles and tubes for donor and patient.

Science News Letter, May 10, 1952

LEATHER WASTE basket containing a removable, steel inner-lining provides a satisfactory receptacle for even wet or soggy trash. Available in 12 colors, the basket is decorated with a 24-karat gold Florentine design, stands 13½ inches high and has a 10-inch diameter.

Science News Letter, May 10, 1952

X-RAY FILMS of four industrial types meet diversified needs of the industrial and scientific radiographer. The films can be used with low or high kilovolt X-ray exposures or with radium or cobalt gamma radiation.

Science News Letter, May 10, 1952

CHILD'S PLACE mat, made of vinyl plastic, protects tables from spilled foods. Shaped like a toy elephant, the brightly colored mat lies flat and will not slip on polished table surfaces. It is easily wiped clean with a damp sponge.

Science News Letter, May 10, 1952

PLASTIC MENDING tape can be used in the home to repair torn plastic raincoats, table cloths and shower curtains. The clear tape is laid over the tear on the underside of the plastic material, covered with a thin cloth and then pressed with a warm iron, as shown in the photograph.

Science News Letter, May 10, 1952

PAINT BRUSH support, clamp and stirrer combination clips on the paint container and holds one or two brushes in the paint, keeping the brush bristles straight and off the bottom of the can. The support is a slotted stirring stick with a spring-action clamp adjustable to hold any size of brush.

Science News Letter, May 10, 1952

TWO HIGH-INTENSITY point-source lamps of revolutionary design are to be manufactured soon for use in searchlights, film projectors, flood- and spotlights. A molten film of zirconium is the light source of one lamp which is said to be more than 10 times brighter than ordinary tungsten types.

Science News Letter, May 10, 1952

NEW DEHUMIDIFIER, said by the manufacturer to reduce mold, rust and mildew in the home or office, can be supplied with a built-in or an optional plug-in humidity control for automatic operation. The unit can maintain the humidity of about 13,500 cubic feet of air at the desired level.

Science News Letter, May 10, 1952

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